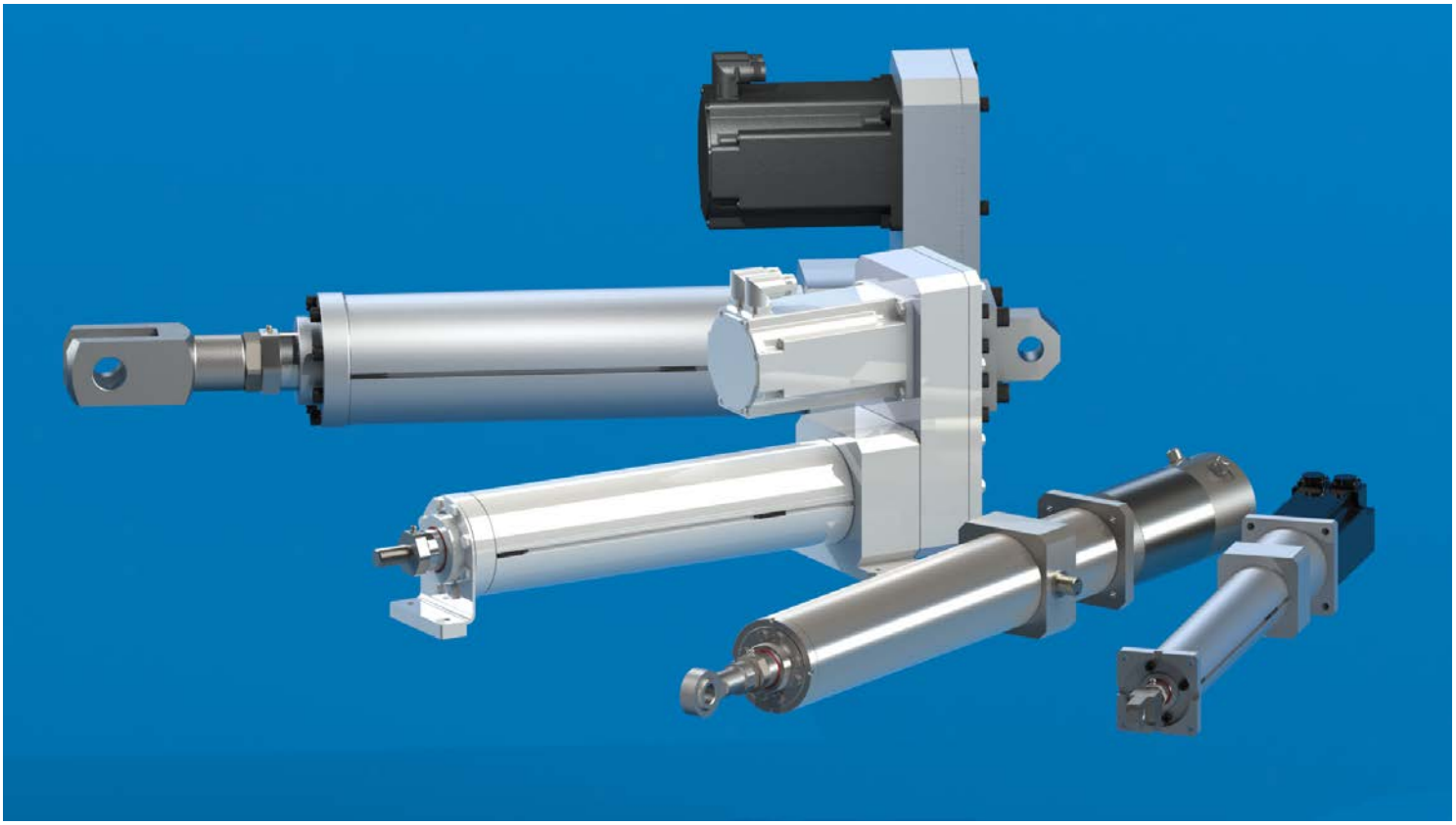

VICTORY A-SERIES USER MANUAL

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Chapter 1 Safety

Safety is held at the highest priority at Precision Technology. It is important to us that our products are not only reliable, but that they are also safe to use. By itself, the unit poses no real threat, however once energy is applied to the actuator, it has the potential to exert large forces capable of injuring personnel and damaging surrounding equipment. As a result, a few key areas of safety require attention. READ ALL SAFETY WARNINGS BEFORE UNPACKAGING THE VICTORY SERIES ACTUATOR.

Personal Protection Equipment (PPE)

Every environment is different. Some of the actuators produced by Precision Technology are used in environments that only require safety shoes while others require safety shoes, safety glasses, ear muffs, and hard hats. It is Precision Technology's recommendation that the user consult with the Safety Organizer of the specific site for the required PPE.

Electrical Hazard

By itself, the actuator does not pose an electrical hazard. The actuator is however designed to be operated by an electric motor which can present certain electrical hazards. Please follow the motor manufacturer's guidelines when installing and connecting to the motor. The VICTORY A-Series actuators are made from conductive metals. As a result, any stray electrical current that comes in contact with the actuator body will be able to travel the length of the actuator, potentially causing an electrocution hazard. Appropriate measures should be taken to prevent this hazard.

Clear Range of Motion

When operated, the actuator has the potential to exert thousands of pounds of force. It is absolutely necessary to ensure that the actuator and connected assemblies have a clear range of motion, free of any parts, tools, body parts, or other obstructions. Appropriate safety measures should be taken to avoid damage or injury.

Back-driving

VICTORY A-Series actuators are supplied with one of three types of power screw drives: acme, ball, or roller. If your unit contains a ball screw or roller screw, it is imperative to know that the unit has the potential to be back-driven. This means that when a load (force) is applied to the rod clevis, there is nothing within the actuator to keep the load stationary. The actuator contains no brake or position holding element and as a result, may see an induced rotation on the input shaft from this load. To resist this rotation, either an external brake or a motor/drive system designed to resist this load will be required. Contact the motor manufacturer or system integrator for more information.

Information Labels and Plates

VICTORY A-Series actuators will be supplied with identification labels and nameplates. It is imperative that these not be removed and should remain in their original position. If labels or plates become damaged, please contact Precision Technology Customer Support for replacements.

Chapter 2 Storage, Unpacking, and Handling

The following will provide guidelines for storage, unpacking, and handling of the VICTORY A-Series actuators.

Storage

To ensure that your VICTORY A-Series actuator remains in optimal condition, it must be stored in the following conditions:

Table 1. Storage Conditions

Temperature	-30° to 70° C
Sunlight	Not Direct
Moisture	< 80% RH
Corrosive Environments	Not Recommended

Handling

The VICTORY A-Series actuators are robust; but they are not indestructible. When handling the unit it is important that personnel follow certain guidelines to ensure that the unit does not become inadvertently damaged.

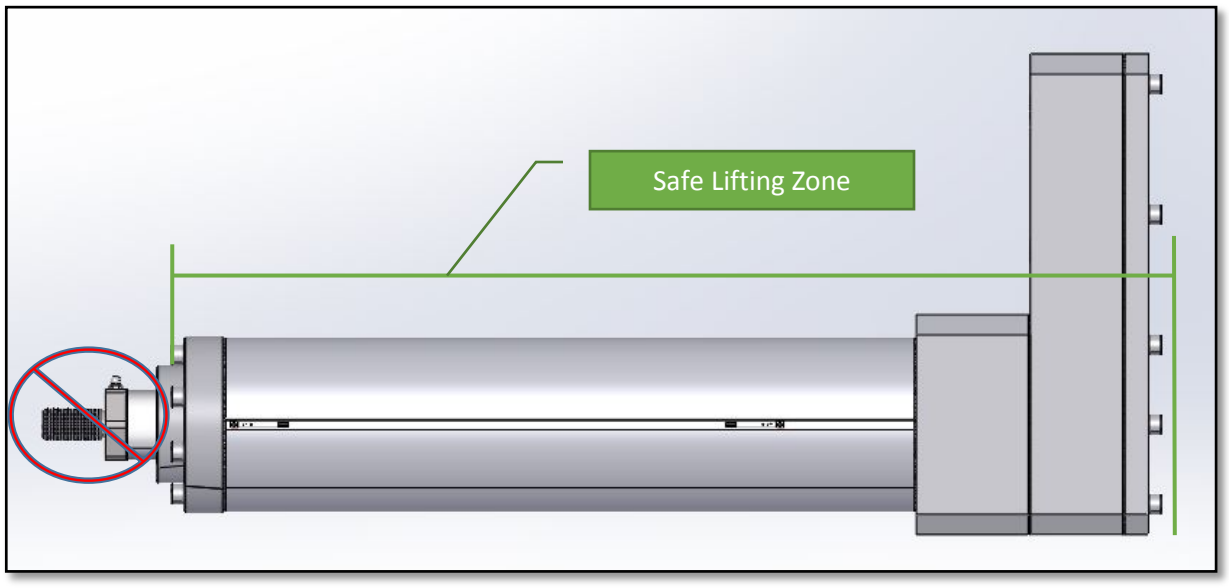


Figure 1. Safe Lifting Points

Ensure that the VICTORY A-Series actuator is in the fully retracted position before handling. Note that the actuator must only be lifted around the outer ram, the rear clevis/flange (if applicable), or the trunnion ears (if applicable). Nylon lifting slings/ropes are highly recommended as to not damage the actuator's finish. The safe lifting zone location can be seen in Figure 1 above. Do NOT lift the VICTORY A-Series actuator by the front clevis, the inner ram, any wires, or motor (if applicable). Lifting at any one of these locations could damage the actuator and void the manufacturer's warranty.

When setting the unit down, never allow the actuator to "drop" into place. Gently allow the actuator to come to rest in a location that is sufficiently able to support the weight of the actuator. (Refer to packing slip for actuator's weight.)

Unpacking

Remove the actuator from the shipping container being careful to fully support the actuator as described above. Gently lay the actuator on a clean, sturdy, and flat surface. If the actuator was shipped in a crate, retain it for future transportation of the system. Next, carefully separate the packing material from the actuator. **Thoroughly inspect the container for loose items that may have shipped with the actuator** (e.g. Documentation, ancillary items such as: limit sensors, couplings, rod-end accessories, etc.). Examine the actuator for any evidence of damage.

Any shipping damages to either the actuator or the container should be immediately reported to Precision Technology USA Customer Service or to the distributor from which it was purchased.

Chapter 3 Installation

Proper installation of the VICTORY A-Series actuator is very important. Improper mounting could lead to actuator damage, adjacent component damage, and even personnel injury. Never force the actuator into place (e.g. using pry bars) and always ensure there is no side load applied to the rod end. Side loading will cause accelerated actuator wear and will void the warranty. If side loading is unavoidable, contact a Precision Technology Applications Engineer for more assistance. Improper connections to limit switches can cause electrical damage and/or allow the actuator to overshoot the desired limit. It is the responsibility of the user to ensure that all support structure and connections are adequately designed by qualified personnel.

Actuator Mounting

The following section describes mounting procedures for each option available for the VICTORY A-Series. It is the responsibility of the user to ensure that all surrounding support structure and connection accessories are adequately designed by qualified personnel. For assistance in these matters, contact Precision Technology Applications Engineering.

Bottom Mounting (BM)

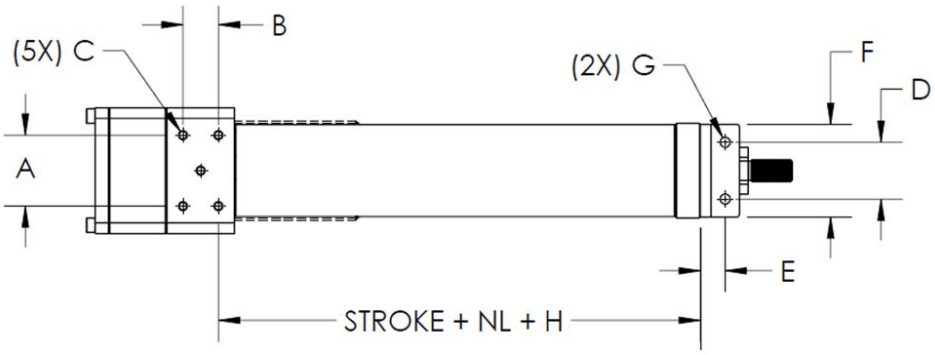


Figure 2. Bottom Mounting Outline Drawing

Table 2. Bottom Mounting Dimensions

	V26A	V32A	V43A	V55A
A	50.80	63.50	82.55	88.90
B	25.40	31.75	31.75	44.45
C	M5x0.8↓14	M8x1.25↓16	M8x1.25↓16	M16x2.0↓32
D	50.80	50.80	76.20	101.60
E	18.9	22.3	25.5	33.3
F	69.1	83.1	109.2	140.3
G	6.60	9.00	9.00	17.50
H	100.7	115.5	139.3	161.7
NL	SEE CATALOG	SEE CATALOG	SEE CATALOG	SEE CATALOG

All dimensions are in millimeters (mm) unless otherwise noted

Bottom Plate (BP)

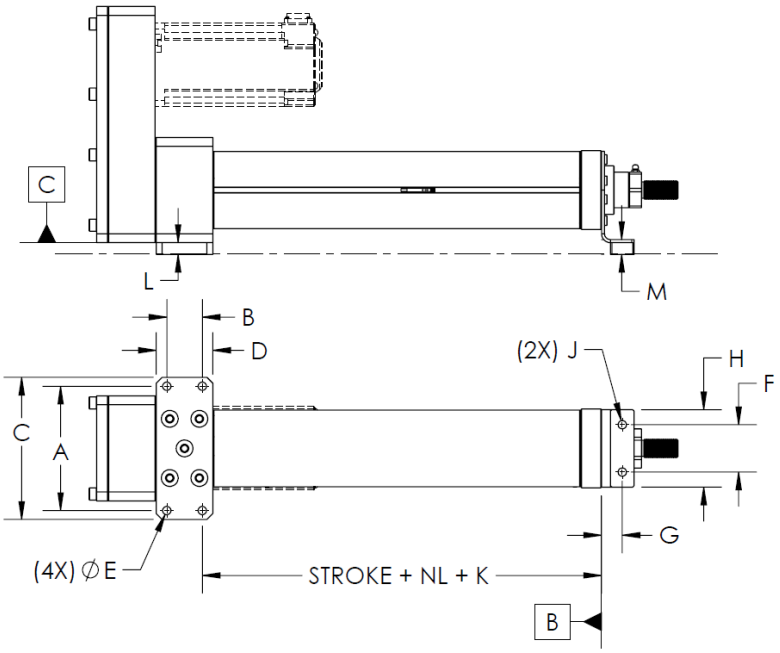


Figure 3. Bottom Plate Outline Drawing

Table 3. Bottom Plate Dimensions

	V26A	V32A	V43A	V55A
A	107.95	133.35	158.75	209.55
B	30.48	38.10	44.45	63.50
C	120.7	152.4	177.8	247.7
D	49.7	60.6	70.4	97.0
E	6.60	9.00	9.00	17.50
F	50.80	50.80	76.20	101.60
G	18.9	22.3	25.5	33.3
H	69.1	83.1	109.2	140.3
J	6.60	9.00	9.00	17.50
K	98.2	112.3	133.0	152.1
L	7.9	12.5	12.5	24.4
M	7.9	12.5	12.5	24.4
NL	SEE CATALOG	SEE CATALOG	SEE CATALOG	SEE CATALOG

All dimensions are in millimeters (mm) unless otherwise noted

The Bottom Mounting and Bottom Plate Mounting options require a supporting structure underneath the actuator. This supporting structure should be strong enough to support the weight of the actuator in addition to the load applied to/from the actuator. The bolt size and mounting pattern for both the Bottom Mounting and Bottom Plate Mounting configurations can be found above in ***Table 2*** and ***Table 3*** respectively. The bolt strength and tightening torque should be determined by the user to sufficiently support any loading the actuator will see. To mount the unit, thread in securement fasteners and tighten until just barely snug.

Follow the instructions in the ***Rod End Mounting*** section below to secure the rod end prior to applying a final torque to the fasteners in a crossing sequence. (The most accurate alignment can be achieved by aligning the rod end with the load prior to fixing the body of the unit to the mounting structure.)

Rear Clevis (CR)

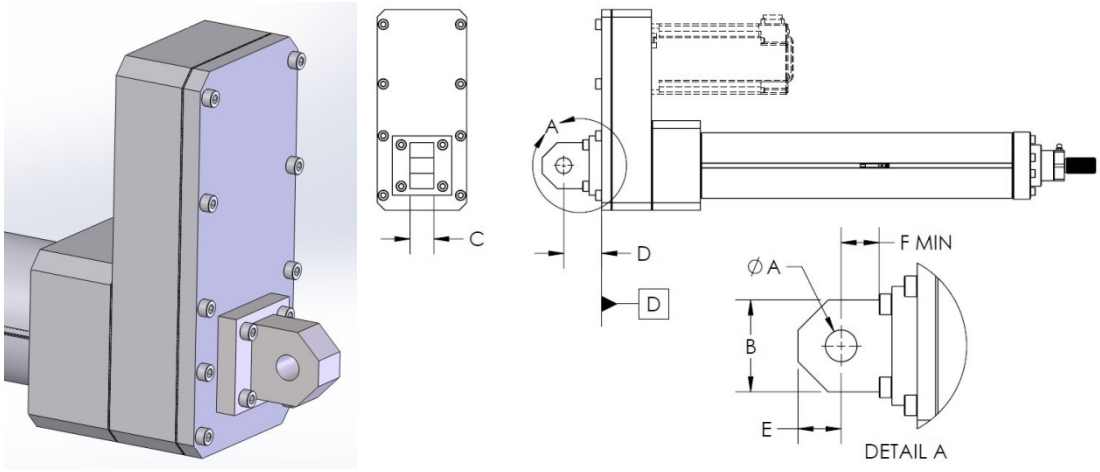


Figure 4. Rear Clevis Outline Drawing and Depiction

Table 4. Rear Clevis Dimensions

	V26A	V32A	V43A	V55A
A	14.0 H9	20.0 H9	20.0 H9	28.0 H9
B	34.0	58.0	58.0	68.0
C	20.0 h13	30.0 h13	30.0 h13	40.0 h13
D	30.9	48.0	48.0	59.0
E	15.5	27.2	27.2	31.0
F	13.0	24.0	24.0	25.0

All dimensions are in millimeters (mm) unless otherwise noted

The Rear Clevis mounting option requires a structure that captures the rear clevis and can provide support for the weight of the actuator plus the load applied to/from the actuator. The pin that is inserted through the structure and clevis (typically NOT supplied by Precision Technology) should be toleranced slightly under the clevis hole diameter shown in ***Table 4***, but should not have excessive clearance. Since the Rear Clevis mounting option allows for motion about the axis of the pin, extra care should be taken that the actuator and adjacent components do not create a situation of interference or side-load on the actuator. (Note: Clevis pins should be secured with a locking device, such a cotter key.)

Rear Flange (FR)

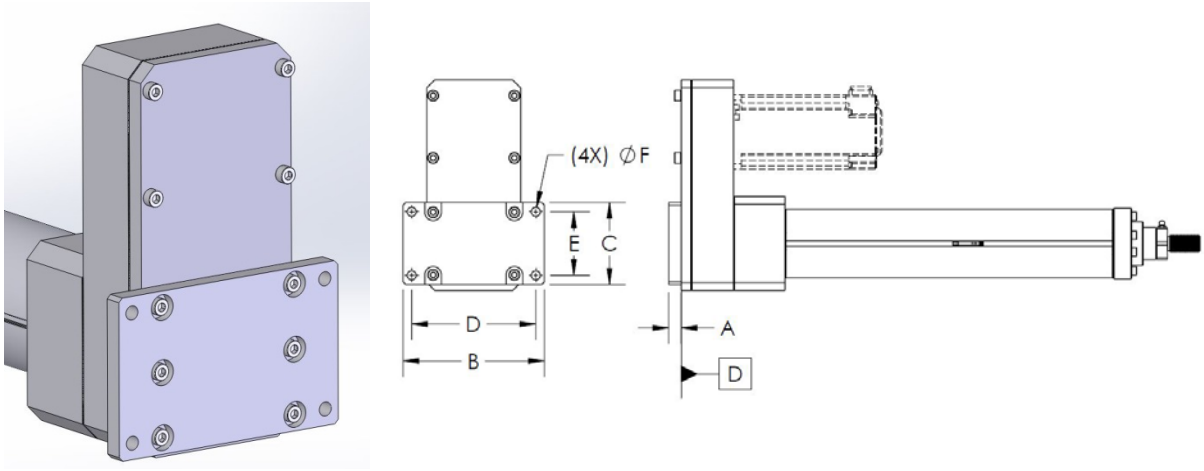


Figure 5. Rear Flange Outline Drawing and Depiction

Table 5. Rear Flange Dimensions

	V26A	V32A	V43A	V55A
A	11.7	15.0	15.0	24.1
B	126.0	169.9	201.7	241.3
C	75.2	98.4	125.5	150.9
D	111.76	149.23	177.80	209.55
E	60.96	76.20	100.08	88.90
F	6.60	11.00	11.00	15.50

All dimensions are in millimeters (mm) unless otherwise noted

The Rear Flange mounting option allows for a rear flange (supplied by Precision Technology) to be bolted to both the VICTORY A-Series actuator (in the vertical orientation) and the supporting structure. If the Flange Rear option is used for an actuator in the horizontal position, the actuator needs to also be supported near the seal carrier (location that the front flange attaches to) so the actuator is not cantilevered. Contact Precision Technology's Applications Engineering if more assistance is needed on this mounting option.

The supporting structure should provide be capable of supporting both the weight of the actuator and the load applied to/from the actuator. The bolt size and mounting pattern for the flange can be found in ***Table 5*** above. The bolt strength and tightening torque should be selected by the user to sufficiently support any loading the actuator will see. To mount the unit, Insert the fasteners and tighten until just barely snug. Follow the instructions in the ***Rod End Mounting*** section below to secure the rod end prior to applying a final torque to the securing fasteners in a crossing sequence. (The most accurate alignment can be achieved by aligning the rod end with the load prior to fixing the body of the unit to the mounting structure.)

Front Flange (FF)

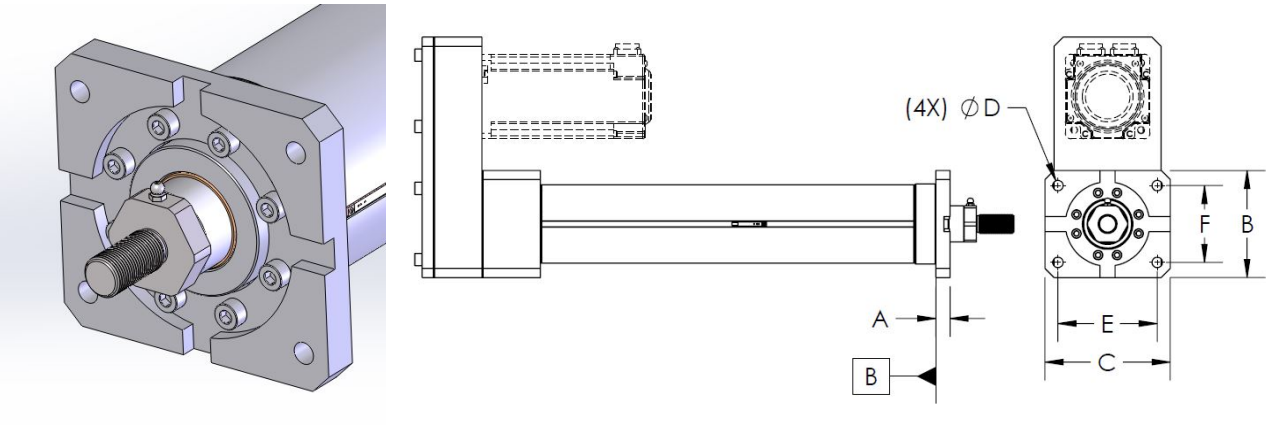


Figure 6. Front Flange Outline Drawing and Depiction

Table 6. Front Flange Dimensions

	V26A	V32A	V43A	V55A
A	15.0	15.0	18.3	24.1
B	87.4	112.8	138.2	163.6
C	87.4	132.1	150.9	163.6
D	6.60	11.00	11.00	17.50
E	72.39	104.78	123.19	133.35
F	72.39	81.03	101.60	133.35

All dimensions are in millimeters (mm) unless otherwise noted

The Front Flange mounting option allows for a front flange (supplied by Precision Technology) to be bolted to both the VICTORY A-Series actuator (in the vertical orientation) and the supporting structure. If the Front Flange option is used for an actuator in the horizontal position, the actuator will also need to be supported at the bearing housing so that the actuator is not cantilevered. Contact Precision Technology's Applications Engineering is more assistance is needed on this mounting option.

The supporting structure should be capable of supporting both the weight of the actuator and the load applied to/from the actuator. The bolt size and mounting pattern can be found in ***Table 6*** above. The bolt strength and tightening torque should be selected by the user to sufficiently support any loading the actuator will see. To mount the unit, insert fasteners and tighten until just barely snug. Follow the instructions in the ***Rod End Mounting*** section below to secure the rod end prior to applying a final torque to the securing fasteners in a crossing sequence. (The most accurate alignment can be achieved by aligning the rod end with the load prior to fixing the body of the unit to the mounting structure.)

Front & Rear Flange (FB)

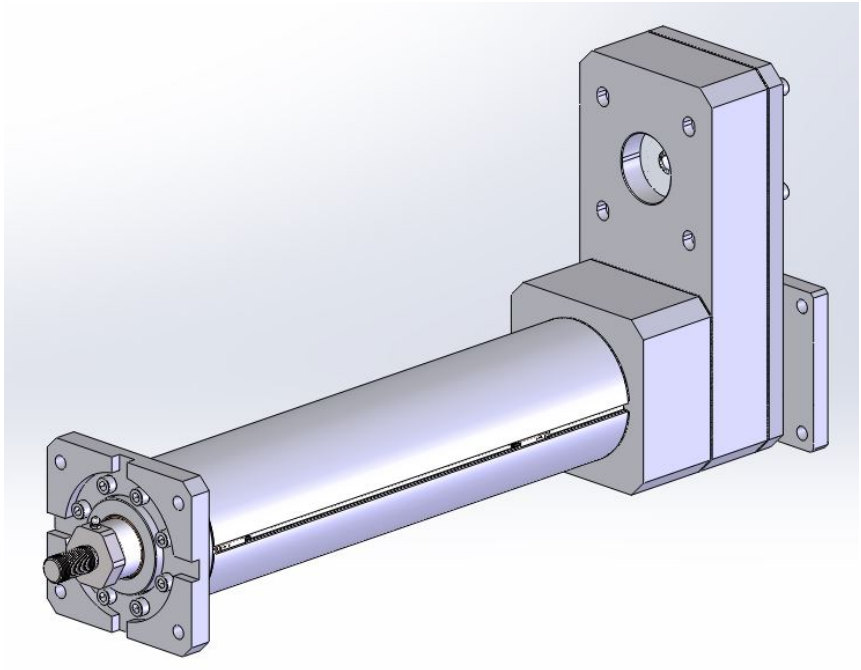


Figure 7. Depiction of Front & Rear Flange Mounting

The Front & Rear Flange mounting, only available in the parallel drive configuration, allows for a front and rear flange (both supplied by Precision Technology) to be bolted to both the VICTORY A-Series actuator and the supporting structure. The supporting structure should be capable of supporting both the weight of the actuator and the load applied to/from the actuator. The bolt sizes and mounting patterns can be found in the ***Table 5*** and ***Table 6*** above. The bolt strength and tightening torque should be selected by the user to sufficiently support any loading the actuator will see. To mount the unit, insert the fasteners and tighten until just barely snug. Follow the instructions in the ***Rod End Mounting*** section below to secure the rod end prior to applying a final torque to the securing fasteners in a crossing sequence. (The most accurate alignment can be achieved by aligning the rod end with the load prior to fixing the body of the unit to the mounting structure.)

Trunnion (TF)

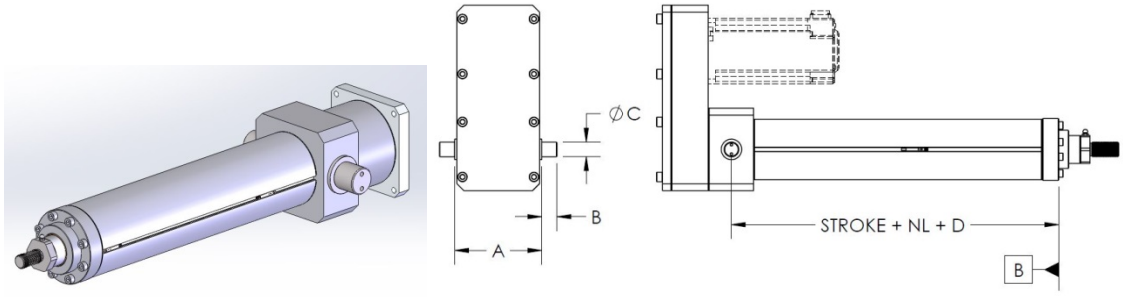


Figure 8. Trunnion Mounting Outline Drawing and Depiction

Table 7. Trunnion Mounting Dimensions

	V26A	V32A	V43A	V55A
A	93.7	119.1	149.6	175.0
B	20.8	20.8	36.5	36.5
C	20.00 g7	20.00 g7	40.00 g7	40.00 g7
D	113.4	131.4	155.2	183.9
NL	SEE CATALOG	SEE CATALOG	SEE CATALOG	SEE CATALOG

All dimensions are in millimeters (mm) unless otherwise noted

The Trunnion mounting allows for the VICTORY A-Series actuator to be "hinged" at the bearing housing. With this option, Precision Technology supplies the trunnion pins preassembled to the bearing housing. **Bushings are available but are supplied as an added option.** All mounting fixtures and the supporting structure should be able to support both the weight of the actuator and the load applied to/from the actuator. To extend the life & decrease the wear on the trunnion interface it is recommended that lubrication be applied between the trunnion pins and the bushings. The trunnion sides can then be bolted to the supporting structure. The bolt strength and tightening torque should be selected by the user to sufficiently support any loading the actuator will see. Insert fasteners and tighten until just barely snug. Follow the instructions in the ***Rod End Mounting*** section below to secure the rod end prior to applying a final torque to the securing fasteners in a crossing sequence. (The most accurate alignment can be achieved by aligning the rod end with the load prior to fixing the body of the unit to the mounting structure.)

Rod End Mounting

The following section describes mounting procedures for each option available for the VICTORY A-Series. It is the responsibility of the user to ensure that all surrounding support structure and connection accessories are adequately designed by qualified personnel. As standard, the VICTORY A-Series will either include a male or female threaded rod end, depending on customer selection at time of order. Three additional ISO standard rod ends are available as accessories, but must be used in combination with the Male Thread (MT) option. It is important to note that the Rod End/Inner Ram is never to be side-loaded. Side-loading will cause accelerated wear on the actuator and will void the manufacturer's warranty. For assistance in designing an adequate support structure, please contact Precision Technology Applications Engineering.

Male Thread (MT)

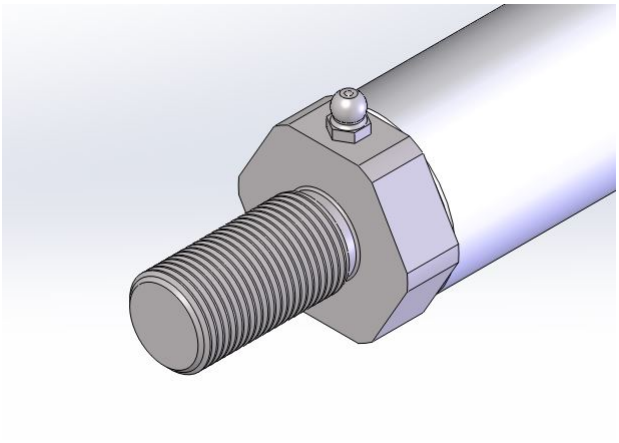


Figure 9. Male Thread Rod End

Table 8. Male Thread Rod End Dimensions

	V26A	V32A	V43A	V55A
Thread Size	M14x2.0	M20x1.5	M20x1.5	M36x2.0
Length	30.2	39.4	39.4	72

All dimensions are in millimeters (mm) unless otherwise noted

The Male Thread rod end is the primary rod end for the VICTORY A-Series. This rod end provides an external metric thread that can be used to attach a mating piece, rod end accessory, or be inserted through the load and secured with a locknut on the backside. The thread sizes and lengths for each unit size are shown in ***Table 8*** above. When loosening or tightening against this thread it is important to ensure that the applied torque is not transmitted to the inner ram. Applying a torsional force to the inner ram could damage internal components and void the manufacturer's warranty. The body of the rod end is a standard hex shape so that a wrench can be used to assist with localizing the transmitted torque.

Female Thread (FT)

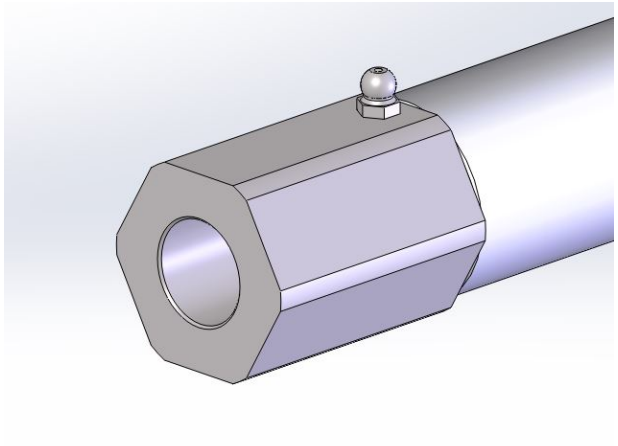


Figure 10. Female Thread Rod End

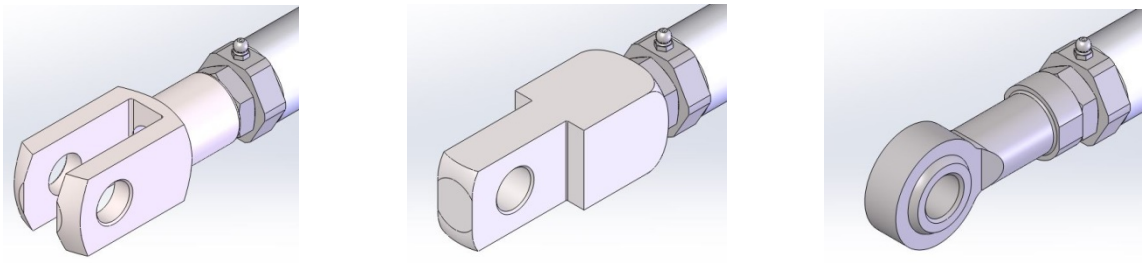
Table 9. Female Thread Rod End Dimensions

	V26A	V32A	V43A	V55A
Thread Size	M14x2.0	M20x1.5	M20x1.5	M36x2.0
Depth	20	28	28	50

All dimensions are in millimeters (mm) unless otherwise noted

The Female Thread rod end provides an internal metric thread that can be used to attach the mating piece or be attached to the load with a threaded fastener. The thread sizes and depths for each unit size are listed in ***Table 9*** above. When loosening or tightening against this thread it is important to ensure that the applied torque is not transmitted to the inner ram. Applying a torsional force to the inner ram could damage internal components and void the manufacturer's warranty. The body of the rod end is a standard hex shape so that a wrench can be used to assist with localizing the transmitted torque.

Female Clevis (FC), Male Clevis (MC), and Spherical Joint (SJ) Attachment Options



Female Clevis Male Clevis Spherical Joint

Figure 11. Female Clevis, Male Clevis, and Spherical Joint Accessories

Table 10. Female Clevis, Male Clevis, and Spherical Joint Accessory Dimensions

		V26A	V32A	V43A	V55A
Female Clevis	**Hole Diam.**	14 H9	20 H9	20 H9	35 H9
	Inner Width	14	20	20	35
Male Clevis	**Hole Diam.**	14 H9	20 H9	20 H9	35 H9
	Width	14	20	20	35
Spherical Joint	**Hole Diam.**	14 H7	20 H7	20 H7	35 H7
	Bearing Width	19	25	25	43

All dimensions are in millimeters (mm) unless otherwise noted

Please see the VICTORY A-Series Product Catalog for a complete description of dimensions and tolerances.

The Female clevis, the Male clevis, and Spherical Joint clevis are all very similar in design and are available as accessories for the standard Male Thread rod ends. These components rely on a pin, inserted through the clevis and load structure, to transfer the force/load. The Spherical Joint clevis attachment differs from the other two options in its ability to allow for rotational wear and misalignment between the ram and the load and is highly recommended in applications where misalignment is likely to occur. Refer to

Table 10 above for nominal pin sizes and clevis width dimensions. The pin (typically not supplied by Precision Technology USA) should be toleranced slightly under these nominal dimensions but should not have excessive clearance. Since these clevises allow for motion about the axis of the pin, extra care should be taken that the actuator and adjacent components do not create a situation of interference or side loading. (Note: Clevis pins should be secured with a mechanical locking device, such a cotter key.)

Motor Mounting

The following instructions should be used for mounting a motor with a drive key. Be sure to locate and follow the correct instruction set for you selected drive type below.

Inline Motor

The VICTORY A-Series actuators with inline motor mounting may or may not come with a motor adapter kit (adapter housings/plates and motor coupling), depending if one was purchased with the unit. This motor adapter kit is included as part of the "Direct Drive" option. If a motor adapter kit was included with your order, it will be preassembled to the VICTORY A-Series actuator along with one half of the coupling. The following procedures will detail how to assemble your motor to the actuator using this drive configuration. If a motor adapter kit ("Direct Drive" option) was not ordered, consult your system integrator for more information on how to mount the motor.

i) Measure the distance from the outermost edge of the motor adapter plate to the inside face (between the jaws) of the actuator coupling half (reference distance "A" in ***Figure 12*** below). Subtract 0.100" (2.5mm) from the measurement and write that number down for the following step.

Distance "A"		inch
	-0.100	inch
Distance "B"		

ii) Install the coupling on the motor shaft (including key if applicable). Set the distance from the mounting face of the motor to the outermost edge of the motor coupling half jaws to the distance noted in the previous step (reference distance "B" in ***Figure 12*** below).

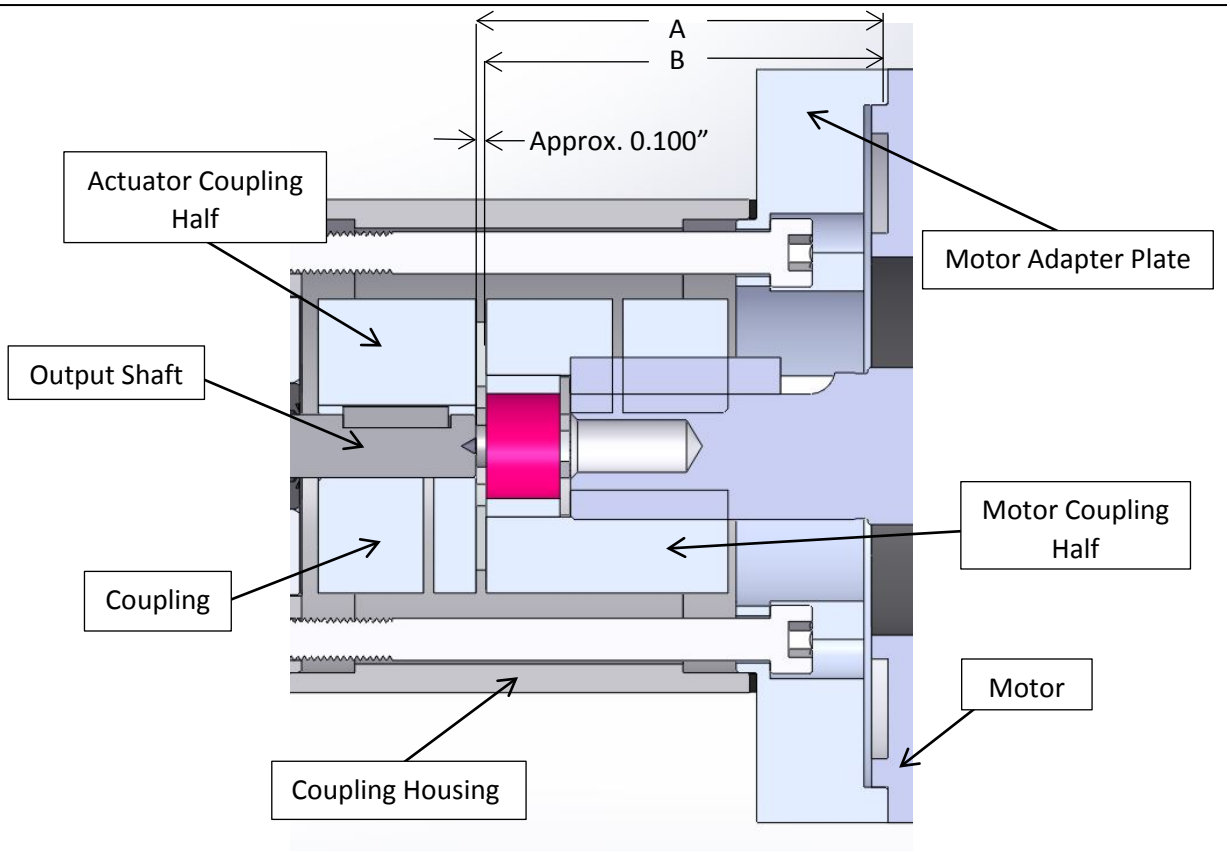


Figure 12. Coupling Mounting

iii) Tighten the coupling clamp screw. The tightening torque can be seen in ***Table 11*** below.
iv) While aligning the coupling halves install the motor onto the adapter housing.
v) Insert mounting fasteners through the motor clearance holes and thread them into the tapped holes in the motor adapter plate.
vi) Tighten the mounting fasteners to a sufficient holding torque so as to prevent loosening in use.

Table 11. Coupling Clamp Screw Torque

Size	V26A	V32A	V43A	V55A
Torque	8 Nm (5.9 ft-lbs)	15 Nm (11.1 ft-lbs)	15 Nm (11.1 ft-lbs)	35 Nm (25.8 ft-lbs)

Parallel Drive

If axial space restrictions exist, or if a built in reduction is desired in the VICTORY A-Series, a Parallel Drive Assembly is available as an alternative to the Direct-Drive motor mounting configuration. The following steps will describe how to mount a motor, with a keyed shaft, to a VICTORY A-Series unit with a Parallel Drive. If your motor has a smooth shaft (no drive key), consult Precision Technology’s Applications Engineering department for assistance.

1) There are several methods for installing the motor on the parallel housing. Below are two suggested methods based on the through diameter (motor or gearbox pilot) on the front

housing on the Parallel Drive Assembly. A combination of the methods described below may also be used. DO NOT REMOVE OR APPLY PRESSURE TO THE PULLEY FLANGES DURING INSTALLATION. (If an additional adapter plate is need to appropriately fit a motor, further instruction may be required. Please consult Precision Technology Customer Service)

a. **Method 1:** IF the pulley *can* pass through the hole in the parallel front housing:
    i. Remove the parallel drive rear, attachment hardware, and sealing gasket from the Parallel Drive Assembly. Set these items aside for reinstallation later.
    ii. Slide the motor pulley onto the motor shaft. **DO NOT** fully torque the locking set screw until you align the pulleys in the following steps.
    iii. Insert the motor shaft/pulley assembly through the pilot hole in the front housing at an angle. Slide belt around actuator pulley and over the motor pulley.
    iv. Align motor such that the motor face is flush with the parallel housing. The belt should now be wrapped around the motor pulley and retained by the actuator pulley flanges.
    v. Install motor mounting hardware. Keep the hardware loose so the motor can slide and the belt tension can be adjusted. **DO NOT** torque the motor screws until the belt has been tensioned in the following steps.
    vi. Align the motor pulley axially on the shaft such that the face is even with the pulley on the output shaft of the actuator as shown in ***Figure 13*** below.
    vii. Apply thread locker and tighten the set screw in motor pulley. The set screw should be torqued sufficiently so as not to work loose during operation.
b. **Method 2**: IF the pulley *cannot* pass through the parallel front housing:
    i. Remove the parallel drive rear, attachment hardware, and sealing gasket from the Parallel Drive Assembly. Set these items aside for reinstallation later.
    ii. Align motor such that the face is flush with the parallel housing.
    iii. Install motor mounting hardware. Keeping the hardware loose so the motor can slide and the belt tension can be adjusted. **DO NOT** torque the motor screws until the belt has been tensioned in the following steps.
    iv. Remove the retaining ring that secures the output pulley.
    v. Remove the output pulley while leaving the output key in the keyway of the output shaft.
    vi. Loop the belt around both pulleys (before installing pulleys on motor the shafts). Align the orientation of the pulley keyways to the motor and actuator shafts.
    vii. Slide both pulleys, and the belt, onto the motor and output shafts.
    viii. Secure the output pulley with the previously removed retaining ring.

ix. Align the motor pulley axially on the shaft such that the face is even with the pulley on the output shaft of the actuator (See ***Figure 13*** below).

x. Apply thread locker and tighten the set screws on motor pulley. The set screws should be torqued sufficiently so as not to work loose during operation.

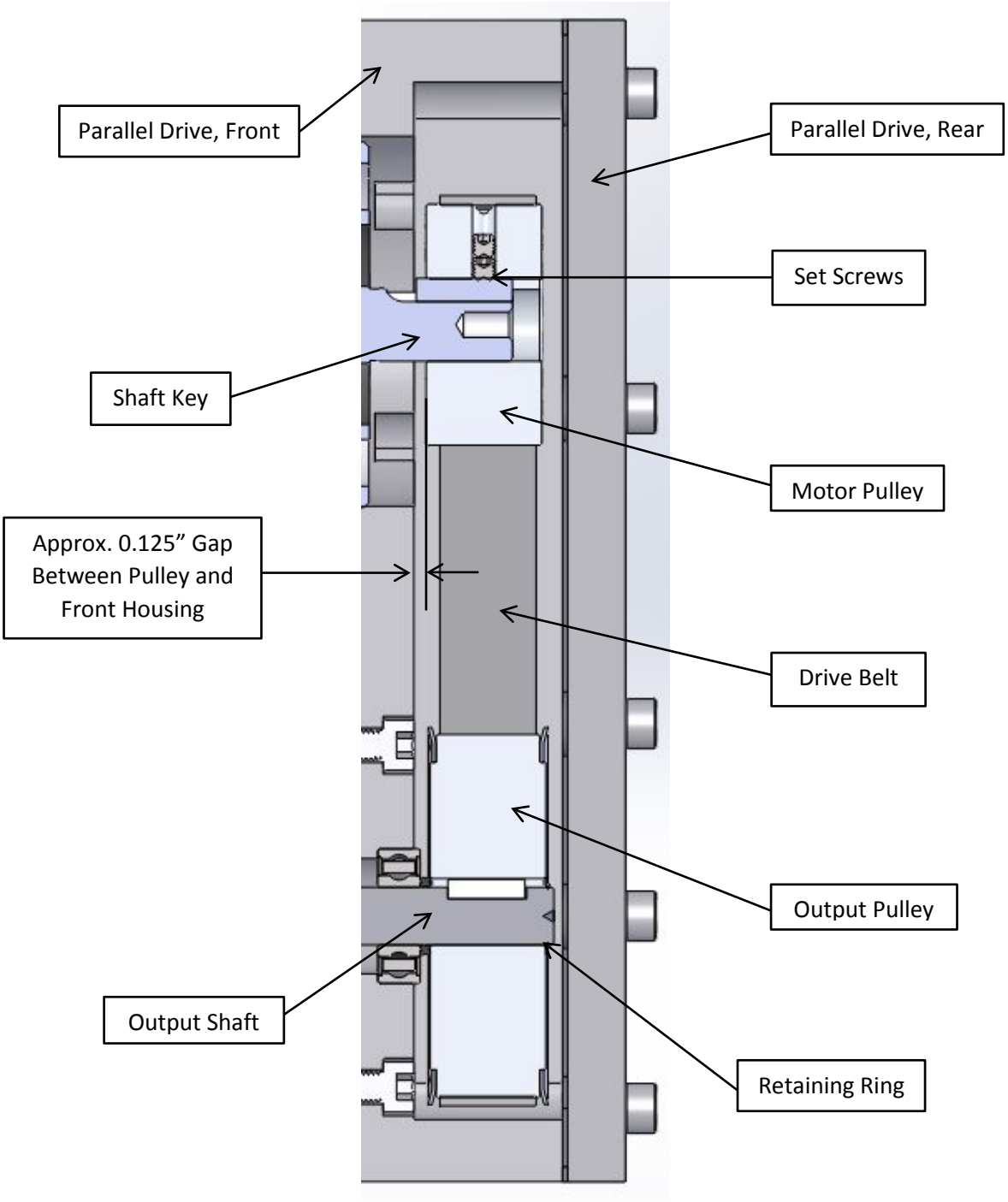


Figure 13. Pulley Mounting

2) Tension the belt.
    a. Being careful not to damage components, slide the motor away from the actuator to increase the belt tension (A non-marring tapered block can be used to separate the motor from the actuator. Be careful not to damage protective paint on FG1 models).
    b. Tighten two of the motor mounting bolts to retain the motor position.
    c. Check the belt tension.
        i. Using finger pressure, the belt should not be able to deflect by more than 1/8" (3.2mm) at mid-span.
        ii. If the belt is able to deflect more than this, repeat steps (a.) and (b.) until reaching a deflection of < 1/8" (3.2mm) at mid-span.
    d. Apply thread locker and torque all motor mounting hardware.
3) Install (4) of the previously removed screws with thread locker and insert through the corners of the parallel drive rear.
4) Slide the parallel housing gasket over the 4 screws.
5) Install parallel housing rear, with gasket, on the front housing. BE CAREFUL not to pinch, cut, or damage the gasket in any way.
6) Apply thread locker and install the remaining rear housing screws, tightening in a crossing sequence. Refer to ***Table 12*** for tightening torques for V26A and V32A units. For bolt patterns and tightening torques for the V43A and V55A parallel units refer to ***Table 13*** and ***Figure 14*** below.

Table 12. V-26A and V-32A Rear Housing Screw Torque

Unit	Bolt Pattern	Fastener Qty./Type	Torque
V26A	A	8 X M6x1.0	11 Nm (8.1 ft-lb)
V32A	A	8 X M8x1.25	10.4 Nm (15.2 ft-lb)

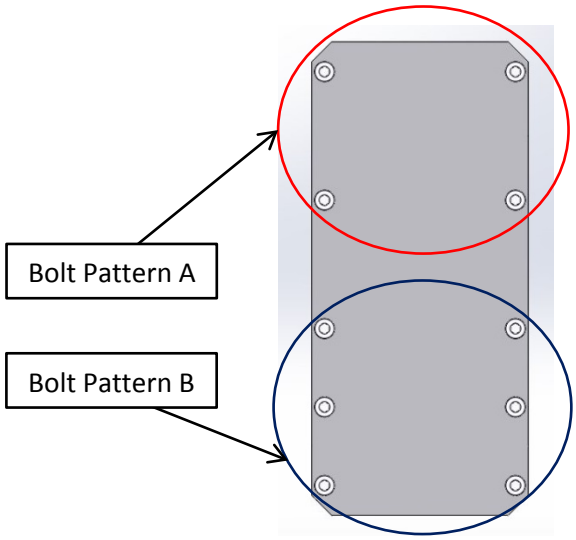


Figure 14. Parallel Housing, Rear, Bolt Pattern, V43A & V55A

Table 13. V43A and V55A Rear Housing Fastener Torque

Unit	Bolt Pattern	Fastener Qty./Type	Torque
V43A	A	4 X M8x1.25	33.1 Nm (24.4 ft-lb)
V43A	B	6 X M8x1.25	24.4 Nm (18.0 ft-lb)
V55A	A	4 X M10x1.5	48.8 Nm (36.0 ft-lb)
V55A	B	8 X M10x 1.5	27.1 Nm (20 ft-lb)

Limit Switches

End-of-travel position sensors (a.k.a. Limit Switches) are required to prevent potentially damaging collisions with the internal hard-stops of the VICTORY A-Series actuators and the attached linkages. If the motor is accidentally commanded to move toward a hard stop, position sensors can provide an alert signal before a collision occurs. To work properly position sensors must be positioned inward from the hard-stop and wired correctly to the motor controller. Refer to ***Table 14*** below for technical data for each style of limit switch offered with the VICTORY A-Series actuators. As with all proximity limit switches, the limit switches of the VICTORY A-Series actuators require integration testing to ensure the electrical signal is captured at the desired location of travel. It is the responsibility of the customer to ensure the limit switches are appropriately placed to prevent any accidental over-travel. Keep in mind that it will take some time to decelerate the actuator and should position the sensor to account for these situations.

The limit switches can also be positioned to reduce travel of a given actuator, a method sometimes used to prevent collision with *external* objects. The locations of the VICTORY A-Series' external limit sensors are adjustable throughout the entire range of travel. Note that position sensors may be mounted along either side of a VICTORY A-Series unit.

In some cases additional home sensors are requested to indicate that the VICTORY A-Series actuator is in a particular location along its travel. This is also referred to as an "index" mark. Home sensors can be the same, or different, electronic "flavor" as the limit sensors.

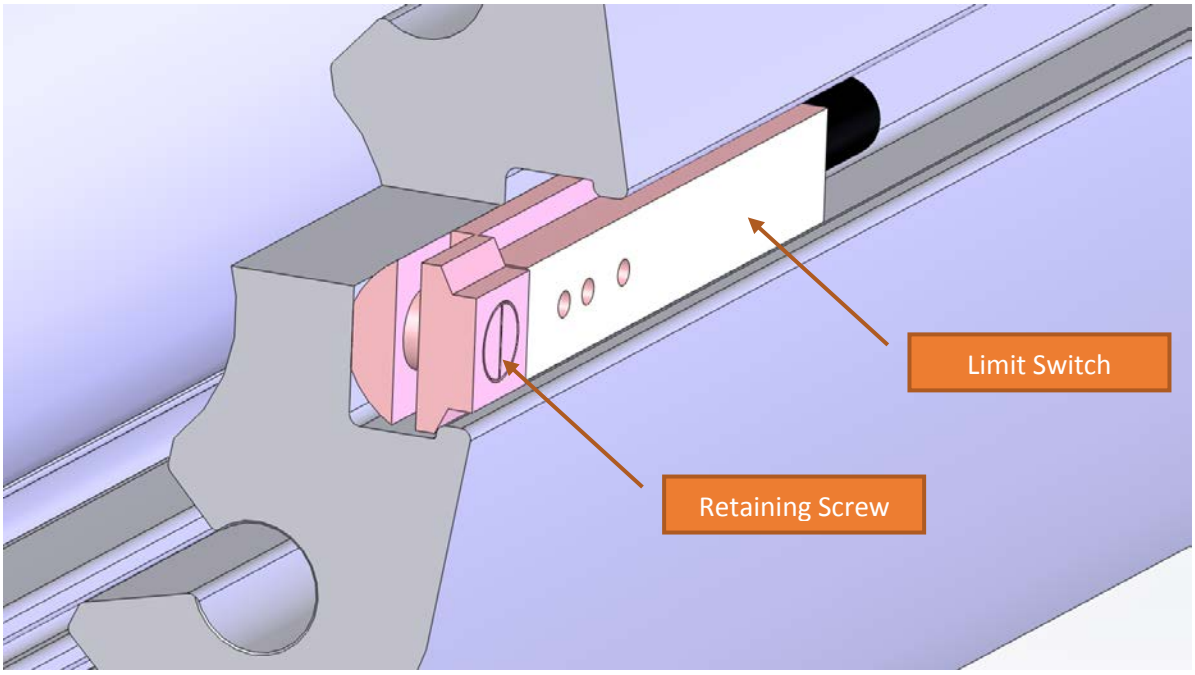
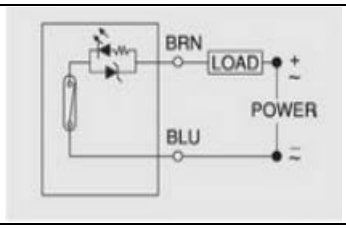
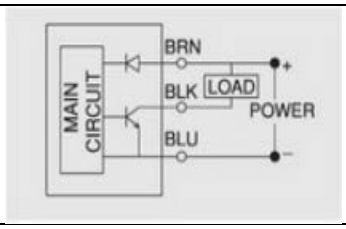
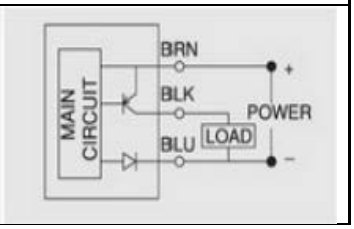


Figure 15. Limit Switch Retaining

To set the position of the limit switch, simply loosen the retaining screw, move to desired location, and re-tighten the retaining screw to a maximum of 7.0 oz-in. Ensure that the top 'hat' of the limit switch is fully seated against the edges of the profile to prevent it from working loose. See ***Figure 15*** above for a better understanding of how the retaining screw functions within the groove of the outer ram.

Table 14. Limit Switch Specifications

PART NUMBER	**PS-RS-NO**	**PS-RS-NC**	**PS-HE-NPN-NO**	**PS-HE-NPN-NC**	**PS-HE-PNP-NO**	**PS-HE-PNP-NC**
WIRING METHOD	2-Wire Type		3-Wire Type		3-Wire Type	
SWITCHING LOGIC	Normally Open	Normally Closed	Normally Open	Normally Closed	Normally Open	Normally Closed
SENSOR TYPE	Reed Switch		NPN Current Sinking		PNP Current Sourcing	
OPERATING VOLTAGE	5-240V DC/AC		10-30V DC		10-30V DC	
SWITCHING CURRENT	100 mA max.		200 mA. max.		200 mA. max.	
CONTACT RATING	10 W max.		6W max.		6W max.	
CURRENT CONSUMPTION	--		20mA @ 24V DC max.		20mA @ 24V DC max.	
VOLTAGE DROP	3.0 V max.		1.5 V max.		1.5 V max.	
LEAKAGE CURRENT	--		0.05 mA max.		0.05 mA max.	
INDICATOR	LED		LED		LED	
CABLE	ø3mm , 2 conductor, 2.5m length		ø3mm, 3 conductor, 2.5m length		ø3mm, 3 conductor, 2.5m length	
OPERATING FREQUENCY	200 Hz		1000 Hz		1000 Hz	
TEMPERATURE RANGE	-10° to 70°C (+14 to 158°F)		-10° to 70°C (+14 to 158°F)		-10° to 70°C (+14 to 158°F)	
SHOCK (NOTE 1)	30 G		50 G		50 G	
VIBRATION (NOTE 2)	9 G		9 G		9 G	
ENCLOSURE CLASSIFICATION	IEC 529 IP 67 (NEMA 6)		IEC 529 IP 67 (NEMA 6)		IEC 529 IP 67 (NEMA 6)	
PROTECTION CIRCUIT	None		Reverse polarity, Short-circuit		Reverse polarity, Short-circuit	
SCHEMATIC						

Chapter 4 Maintenance

Cleaning

The exterior of the VICTORY A-Series actuator should be cleaned on a regular basis. The ambient environment will determine how frequent this is performed. For example, once a year may be sufficient for a clean room environment, while a saw mill may require cleaning once a week, or even more frequently depending on the environmental conditions. Consult your on-site maintenance engineer for more guidance. At the very least, the actuator should be cleaned every time it is lubricated. Special attention should be given to the cleaning of the inner ram. When cleaning, a non-abrasive cloth can and should be used to remove most contaminants without damaging the actuator's finish. A small amount of commercial grade solvent (e.g. brake cleaner or denatured alcohol) may be used as well for extremely soiled actuators. Do NOT use abrasives (e.g. wire wheels, sand paper) or harsh cleaners (e.g. acidic cleaning agents).

Inspection

Whenever the VICTORY A-Series actuator is cleaned it should also be inspected. Common items to be on the lookout for are:

- Stress or fatigue cracks
- Excessive wear on the chromed inner ram
- Excessive corrosion
- Excessive lubrication leakage
- Skinned/Bare Wires

If any of these conditions are found, the unit should be locked-out/tagged-out from use and Precision Technology's Customer Service should be contacted for further guidance.

Lubrication

Before your VICTORY A-Series actuator left the manufacturing plant, it was lubricated with Mobilith SHC 220 grease. In addition to this initial greasing, the VICTORY A-Series actuator will require regular lubrication. The lubrication point can be found at the rod end clevis. By use of a grease gun, calculate and insert the specified amount shown in Table 13 below. Jog the actuator from end to end ten times (unpin the actuator if necessary) to distribute the lubrication along the power screw.

Table 15. VICTORY A-Series Lubrication Data

Type		**Mobilith SHC 220**
Frequency		Every 1 Million Inches of Travel
		In^3 (cc)
Grease Volume (per inch of stroke)	**V26A**	0.008 (0.13)
	V32A	0.010 (0.16)
	V43A	0.013 (0.21)
	V55A	0.020 (0.33)

Example:

A V32A with a 25.0" stroke will need 0.25 in^3 (4.0 cc) of Mobilith SHC 220 grease every 1,000,000 inches of travel. If the unit completes 2,000 cycles (in and out) a day, the VICTORY unit would need lubricated every 10 work days.

Chapter 5 Troubleshooting

The guide below offers assistance when troubleshooting basic VICTORY A-Series actuator problems related to mechanical operation. When troubleshooting actuator performance, it should be noted that the cause may be related to the motor or drive used rather than the VICTORY unit. Refer to the manuals for those third-party components as necessary for troubleshooting your complete system.

Symptom	*Possible Cause*	*Possible Remedy*
Scenario 1: Actuator Operates, But Not Correctly		
Unusual Noises (Squeals, Ticks, Knocks, etc.)	Actuator Needs Lubrication	Lubricate the Actuator per Maintenance Instructions
	Excessive Side-loading	Remove Side-Load
	Internal Actuator Damage	Contact PT-USA Technical Support
Rough Operation or Vibration	Actuator Needs Lubrication	Lubricate the Actuator per Maintenance Instructions
	Excessive Side-Loading	Remove Side-Load
	Motor Unstable (Servo Gains, Stepper Resonance)	Reduce Motor Gain for Servomotors (Increase Step Resolution for Step Motors)
	Actuator Being Operated In Excess of the Critical Speed	Reduce Velocity
	Internal Actuator Damage	Contact PT-USA Technical Support
Acutator Has Erratic Motion	Load too Great for Actuator or Motor	Reduce Load
	Excessive Side-loading	Remove Side-Load
	Misaligned Installation	Check Alignment of Actuator's Mounting Structure
	Belt (Parallel Option) is Loose or Damaged	Adjust Belt Tension (Replace Belt if Necessary)
	Pulley or Coupling Not Secured to Shaft	Secure Pulley or Coupling
	Motor/Controls Malfunction	Consult Motor/Controls Manufacturer
	Internal Actuator Damage	Contact PT-USA Technical Support
Scenario 2: Actuator Operates, But Has Position Problems		
Actuator Does Not Achieve Desired Travel Position	Position-Sensors Reducing "Actual" Travel	Adjust Sensors to Increase Actuator Travel Without Allowing Actuator to Hit Its Internal Hard-Stop Bumper
	Customer Mounting is Physically Limiting Travel	Check Mounting and Make Necessary Adjustments
	Pulley or Coupling Not Secured to Shaft	Secure Pulley or Coupling
	Motor/Controls Malfunction	Consult Motor/Controls Manufacturer
	Internal Actuator Damage	Contact PT-USA Technical Support
Excessive Axial Endplay (System Backlash)	Internal Actuator Wear	Contact PT-USA Technical Support
	Internal Actuator Damage	Contact PT-USA Technical Support
Clevis Rotates	An Internal Connection is Loose or Damaged	Contact PT-USA Technical Support
Scenario 3: Actuator Will Not Operate		
Actuator is Located at the End of Stroke and Will Not Move	Actuator Has Been Bottomed Out and Has Internal Damage	Contact PT-USA Technical Support
Actuator is Located Within Working Stroke and Will Not Move	Load Too Great for Actuator or Motor	Reduce Load
	Excessive Side Loading	Remove Side-Load
	Belt (Parallel Option) is Loose or Damaged	Adjust Belt Tension (Replace Belt if Necessary)
	Pulley or Coupling Not Secured to Shaft	Secure Pulley or Coupling
	Motor Has Overheated	Verify Controls Settings and Allow Motor to Cool (The Duty Cycle May be too High)
	Motor/Controls Malfunction	Consult Motor/Controls Manufacturer
	Internal Actuator Damage	Contact PT-USA Technical Support

Before contacting Precision Technology Customer Service, please collect the following information!

Actuator Model*	
Actuator Serial Number*	
PO Number*	
Order Number	
Stroke Length	
Actuator Velocity	
Force Applied	
Compressive or Tensile Force	
Description of Duty Cycle	
Estimated Cycles Since Last Lubrication	

*Required Information

Technical Support

Precision Technology offers Technical Support through its factory-based Applications Engineering and Inside Sales departments.

If problem persists after troubleshooting or if the product has failed, contact our factory at (888) 324-0858, or at (540) 857-9871.

Chapter 6 Warranty

Precision Technology, Inc. warrants all VICTORY A-Series actuators to be free of defects in material & workmanship for a period of one year from the date of shipment to the user. Precision Technology reserves the right to inspect or perform warranty service on-site at the customer's location. If Precision Technology determines that it would be best to have the unit returned, the product will be returned prepaid to the factory and will be repaired or replaced, at our option, at no charge and returned prepaid to the user.

Improper Use or Installation

Products that fail due to improper use, improper installation, or misapplication are not subject to the terms of this warranty.

Side-Loading

The VICTORY A-Series actuators are not to be side-loaded without expressed written permission from Precision Technology USA. Side-loading is defined as any force, intentional or not, that is exerted on the Rod End or the Inner Ram in a direction other than purely axial. Any side-loading of a VICTORY A-Series actuator without the expressed written permission from Precision Technology USA wholly voids the manufacturer's warranty.

Over-Travel

Over-travel excursions, resulting in inner ram collisions with the hard stops, are potentially damaging to the actuator and must be avoided. Damage incurred as a result of over-travel is not covered by Precision Technology's Product Warranty. Limit sensors are recommended for all actuators to prevent over-travel. The location of any limit switch is adjustable and should be installed in accordance with the guidelines provided.

Limit switches alone do not guarantee over-travel protection since load, speed, and the resulting momentum of the user's move profile will affect necessary stopping distance. Brakes or over-travel allowances sufficient to stop the inner ram prior to hard stop contact are the responsibility of the user.

Modifications and Alteration

No alterations or modifications may be made to the unit without expressed written permission from Precision Technology USA. Any unilateral alteration of this kind voids the liability of PT-USA.

Unauthorized Disassembly

The unit must not be disassembled beyond what is specified in the instructions contained within. Any further disassembly wholly voids the manufacturer's warranty.

Chapter 7 Revision History

REVISION	*DESCRIPTION OF CHANGE*	*DATE*	*APPROVED BY*
1.0	INITIAL RELEASE	11/11/2014	GMK